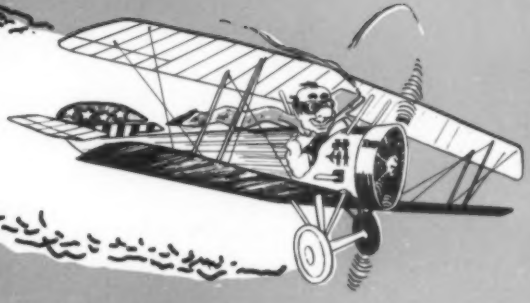
The MAC Flyer

SEPTEMBER 1976

INTRODUCING :

The Flying Circus



Page 3.

MILITARY AIRLIFT COMMAND

GEN PAUL K. CARLTON Commander

LT GEN JOHN F. GONGE Vice Commander

BRIG GEN WILLIAM E. CARSON Inspector General

COL EMERY J. CRANE Director of Safety

For Greater Efficiency
in MAC Air Operations

The MAC Flyer

THE STAFF

LT COL JOHN W. RAY Supervising Editor

MAJ ORLEN L. BROWNFIELD Associate Editor

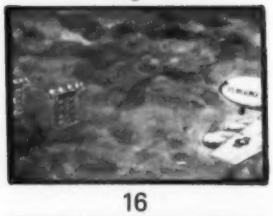
CAPT BRUCE L. GUMBLE Associate Editor

ISOBEL M. BRYANT Managing Editor

BRIAN L. GAUSS Art Director

SEPTEMBER 1976 MACRP 127-5 VOL XXIII, NO. 9

6



16

24

The Flying Circus 3

Safe and On Time 6

Epitaph for a Fool 10

Objects in Motion 12

Tiger One 16

TMF Interview:
The Maharishi Beam Bogie 20

Good Show 23

C. R. Terror 24

Quick Stoppers 28

THE MAC FLYER is published by the Directorate of Safety, Headquarters Military Airlift Command. The contents are informative and not regulatory or directive. All names in accident stories are fictitious and no information concerning aircraft accidents may be construed as incriminating under Article 31, UCMJ.

Contributions, comments, and criticisms are welcome. Write: The Editor, THE MAC FLYER, MAC/IGFE, Scott AFB, IL 62225, or call: (618) 256-3534, Autovon 638-3534. The editor reserves the right to change manuscripts to improve them or correct technical errors.

The magazine is available from: The Superintendent of Documents, Government Printing Office, Washington, DC 20402. Price 70 cents per copy, $7.90 per year ($9.90 foreign).

Distribution F, X; OPR MAC/IGFE.

Not long ago, we received a letter from a reader inquiring about a 1971 TMF article called "Mind Benders." It was a collection of stories culled from accident and incident reports, all of which were characterized by strange twists of fate, incredibly good or bad luck, and—sometimes—by a degree of ineptitude approaching the nadir of human capability. At any rate, our reader had enjoyed it and wondered if we had plans to do it again. We hadn't—but with the innate flexibility of all journalists, we immediately formulated some and went looking for material.

As it turned out, we had plenty, including one item from the original collection which was good enough to do again. What we didn't have was a title, as the original had been appropriated by another magazine (may their pages be filled with typos). So with suitable apologies to Monty Python, we dubbed our latest effort "The Flying Circus" and went to press.

We'd like to make the "Circus" a regular feature, or at least a more frequent one, but we need a little help from our friends. If you enjoy the article and think you have a story that fits the mold, send it to us and we'll add it to the collection. (We can guarantee anonymity if it's one of those stories you didn't plan to tell anybody until after you'd retired). Just jot down the gory details—try to avoid using a grease pencil, as it tends to melt in the mail—and send them to Editor, THE MAC FLYER, MAC/IGFE, Scott AFB, IL 62225, *where they will (hopefully) be turned into deathless prose for the enlightenment of all.*

And now, ladies and gentlemen, please sit back, suspend your disbelief, and enjoy the show.

Too many hands

An experienced pilot was on his first ride in the right seat of a C-47. The instructor pilot demonstrated the takeoff and briefed the new copilot on his duties during a closed traffic pattern. The crew completed their before-landing checks on downwind and were cleared for a touch-and-go landing.

On short final, at about 400 feet AGL, the IP asked for a final gear check. The copilot complied with a visual thumbs-down signal. Unfortunately, the signal was somewhat overenthusiastic; the copilot's swinging left hand struck the right feathering button and the prop, as advertised, came to attention.

The instructor, feeling the yaw and power loss, slightly advanced both throttles. Assuming they were making a missed approach, the copilot asked, "Going around?" Then, presumably overcome by zeal and initiative, he snatched up the landing gear before the startled instructor could say a word!

The IP, realizing he was now committed to a missed approach, applied full power to the left engine and asked the flight engineer to unfeather the right. But by this time, the malady afflicting the copilot had begun to spread, and the engineer smartly reached up and feathered the left.

The IP, now beginning to accumulate glider time, was still unwilling to give up. "Landing gear down," he called—but the copilot, not about to be outdone by the engineer, lowered full flaps instead. Frantically, the IP managed to get the gear down himself just in time to flare the silent Gooney Bird smoothly onto the runway. But the right main had not locked completely down, and the aeronautical Keystone Kops routine finally ended with a folded main gear and damage to the right wingtip and propeller.

Look, Ma, no ailerons

Things were going smoothly as the twin-

turboprop Navy aircraft cruised at FL 180. Smoothly, that is, until the pilot made a small aileron input with the yoke—and got no response. The yoke flopped freely from side to side with no restriction, and with no movement of the ailerons.

Luckily, the aileron trim still worked, and the pilot found that he was able to maintain wings level through judicious trim inputs. As he walked this delicate aerial tightrope, other crew members removed the access panel covering the aileron control installation.

Once the panel was off, the crew discovered that the nut, bolt, washer, and cotter pin which were supposed to hold the aileron torque tube to the bellcrank were conspicuously absent. At the pilot's direction, a crew member held the aircraft wings level by physically manipulating the torque tube while others went in search of something to hold the aileron control system together.

Eventually, one crew member found a bolt of approximately the right size in the aft compartment. In a sterling display of crew coordination, the pilot moved the yoke as directed by the crew member controlling the ailerons until the bolt holes in the bellcrank and torque tube were lined up. The substitute bolt was quickly inserted. The crew then heaved a large sigh of relief and settled down to the task of watching the jury-rigged controls until an uneventful landing at destination.

Roger, we've got it

Shortly after a night takeoff, the backseat instructor pilot lost his interphone and UHF radio. Unable to regain communication with either the outside world or his student, he shook the stick and began a turn to position himself on downwind for a radio-out pattern. The front-seat student recognized the IP's control inputs, but missed the stick-shaking signal; so he continued on the stick with his instructor.

While maneuvering to downwind, the IP felt the student on the controls and shook the stick again. The student acknowledged the change of control verbally, an unproductive procedure under the circumstances, and then shook the stick again. Feeling the IP shake the stick yet again, the student assumed that he was to take control and attempted to do so.

By now, each pilot thought that he was controlling the aircraft, and that the other's inputs were control malfunctions. As the double pilot-induced oscillations became progressively wilder, the IP decided that a loss of control was imminent. He ejected safely, followed immediately by his student.

A screeching halt

The single-seat fighter jock had returned from a routine mission and decided to get in a few practice approaches before calling it quits. On outside downwind after his first low approach, the pilot advised the tower of his intention to fly an overhead pattern for another low approach and then a closed pattern for a full stop. But, prior to turning initial for the overhead, he changed his mind and advised tower that the overhead approach would terminate in a full stop. He was absolutely right.

The gear was lowered normally on downwind, and the mobile control officer verified gear down and locked and speed brakes extended. Touchdown was normal—but shortly thereafter, all three gear retracted and the big fighter slid to an ignominious halt on its fuselage and external fuel tanks.

Apparently, habit pattern interference was the culprit. The pilot had every intention of making a full stop—but his mind was still programmed for a low approach. So, just after touchdown, he did what he would have done on any low approach: he raised the gear.

Who's on final?

The attention of the controllers at a large Air Force base was focused on the final approach to runway 36. In minutes, a C-141 with an emergency gear condition and some highly explosive cargo was to land, and preparations for its arrival were underway. The Starlifter crew reported on final and received landing clearance.

Meanwhile, at a major civilian airport several miles to the south, a civilian student pilot on a solo cross-country flight contacted the tower for landing information. He was informed that the active runway was 18 and that the tower did not have him in sight. But the student reported that he saw the runway and was cleared to land.

Minutes passed, and the controller at the civil field still hadn't spotted the little trainer. Becoming suspicious, he asked for the student pilot's position.

"I'm on short final," he answered.

Now the tower controller was almost certain that the student was attempting to land at the Air Force base to the north. He questioned the pilot about the color of the runway and the tower, and confirmed his suspicions. But it was too late, as the pilot reported that he was already on the ground and that a large aircraft was rolling down the runway at him!

The alert controller instructed the student to pull off the side of the runway and to contact the Air Force tower. The student complied, leaving the startled MAC crew plenty of room to taxi around his aircraft. Meanwhile, the civilian controller notified the Air Force tower of the incident. The blue-suiters, who had not noticed the presence of the civilian airplane until he was already on the ground, then provided an appropriate welcoming committee.

Cessna 'chute-down

Usually, when a parachutist leaps from an aircraft, he contacts terra firma somewhat earlier than the machine from which he departed. Usually—but not always.

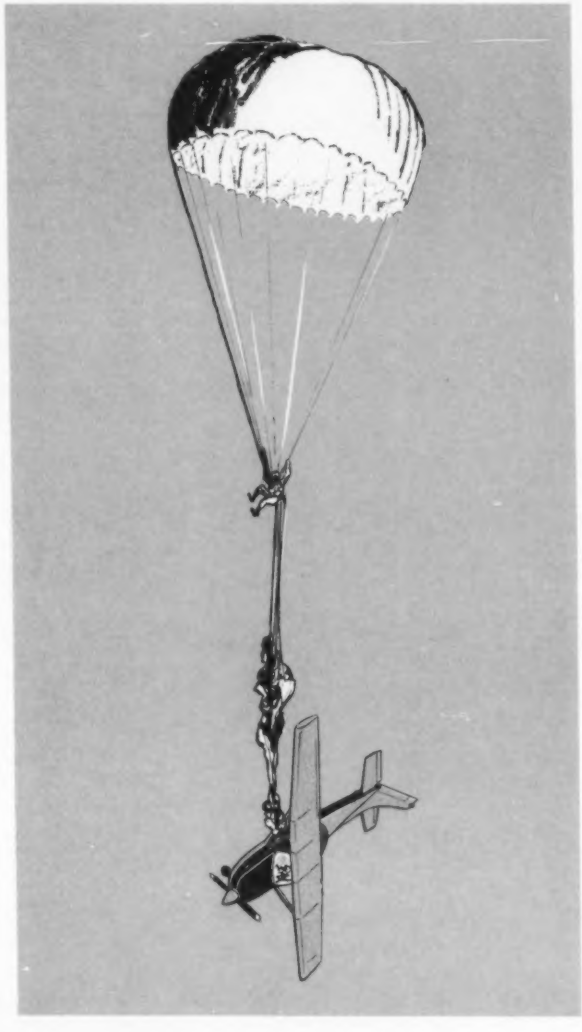
Four sport parachutists, three students and one instructor, were to make a static line jump from a Cessna 182 cruising at 2,500 feet. The first student jumper got off safely, but as the second exited the aircraft, he slipped on the step and fell in front of the landing gear. Instinctively, he grabbed for the wing strut and hung momentarily; then he let go. But during the process, his chute had deployed and had wrapped itself around the landing gear.

Now the jumper was dangling below and behind the Cessna, which was struggling to stay airborne against the extra drag. A hairy situation, indeed, but not yet critical; the student jumper still had his reserve chute. The jump instructor in the aircraft began working to cut the tangled main chute loose, but before he could free the lines, the excited student popped his reserve chute, which deployed as designed.

This was too much for the 182, which promptly quit flying and flopped over on its back. Not being rigged for inverted flight, the engine stopped. The whole assemblage headed for the ground: first the aircraft, dangling by its landing gear from the shroud lines of the student jumper's main chute, then the student, and finally the seriously overworked reserve chute.

Incredibly, no one was killed. The occupants of the aircraft sustained some fractures, and the student jumper was uninjured. The reserve chute, designed to let down a 200-pound jumper at 20 feet per second, had managed to lower a 2,500-pound load to earth at 45 feet per second.

Now, for you navigators who have trouble hitting the DZ ... .



by Capt Bruce L. Gumble
Associate Editor

Safe and On Time

Brakes?"

"Checked."

"Flight instruments, checked co—oops, looks like my ADI's dead."

"Are you kidding? Didn't you look at it in the chocks?"

"Didn't know I was supposed to. Doesn't the engineer check it?"

"No, he just checks the vertical scale gauges."

"Okay, so now I know. Want me to give Mother a call?"

"Are you kidding? It's only nine minutes till delay start. Besides, the weather looks pretty good."

"Okay—it's your airplane."

"Sir, we've got a 141 inbound with both attitude indicators out. He's on top of a cirrus deck at forty-three thousand; he's going to try to get far enough south to let down VFR."

"Oh, great. What's the

Playing "beat the clock" can be a very dangerous game when you let the pressure of time stack the odds against you.

weatherman have to say?"

"He thinks the cirrus extends maybe three hundred miles south; then there's some scattered-to-broken down lower."

"Three hundred miles, huh? How much gas have they got?"

"About an hour's worth."

"Ouch. Let's hope the stuff breaks up pretty soon."

"It'd better—they've only got another thirty minutes of daylight."

•

"Nav, pilot. I'm not getting anything on my scope."

"I know—neither am I. Looks like a bad TR unit."

"Was it okay on preflight?"

"Dunno—there were so many maintenance trucks milling around that I never could get a clear area to check it."

"Oh, great. If we tell 'em about it now, we'll buy a crew delay for sure. Hope we can get around this stuff visually."

" . . . THE AIRCRAFT WAS FLOWN INTO AN AREA OF THUNDERSTORMS WITHOUT AN OPERABLE RADAR (CAUSE)."

•

"Chuck, you want to take the first leg? I'm not feeling too great."

"What's wrong, Sir?"

"Pain in my chest—gas, I think. It'll clear up as soon as I can get an Alka-Seltzer or something."

"Sir, are you sure you ought to be flying?"

"It's okay—I've had these before. Besides, I'm not about to take a crew delay."

"Well, all right, Sir, if you're sure . . . "

"Colonel, that 0900 launch is on his way back in with an emergency. AC's incapacitated—looks like a heart attack."

"What's their ETA?"

"About fifteen minutes. We thought about diverting them because of the weather, but it would take too long to get to anyplace with decent medical facilities. The copilot's pretty new, but his ops officer thinks he can hack it."

"What's the weather now?"

"About at minimums, Sir."

"Okay—tell the copilot he's got one shot at it. If the approach doesn't look just right, he's to take it around and go someplace where the weather's good."

"But, Sir, that will mean—"

"I know what it means. Just tell them."

•

Three imaginary situations, three different sets of circumstances. And one thing in common: a breakdown of professionalism and good judgment under the pressure of an on-time departure.

"Safe and on time" is a catchy phrase. But unless we consistently and deliberately work on achieving both halves of the concept, it can never be anything more. Let's take a look at the "safe" part of that phrase first.

How Not To Do It

Keeping a departure safe involves quite a few "don'ts." Most of them apply primarily to the aircraft commander since he is—or should be—the crew's decision-maker. Violating any of them can easily put you between the proverbial rock and a hard place. And most of them, if not observed, will contribute to a takeoff

that's late as well as unsafe. Some examples:

Don't take shortcuts. There's an old saying that shortcuts make long delays. Zipping through a preflight to "make up time" is a good way to buy a delay, particularly when the discrepancy that should have been found—and fixed—on preflight is finally discovered on taxi-out.

Much more important is the tendency for shortcuts to cause accidents. If you're pressed for time, rushing through or skipping checklists is not the way to make it up. Last year, the crew of a commercial airliner died primarily as the result of missing a single checklist item: the pitot heat.

Don't take a sick airplane. This may sound so obvious that it doesn't need to be mentioned, but every year somebody winds up in front of an accident board, or in the obituary column, because he took a machine that wasn't capable of safe flight. It's a good bet that we've all flown airplanes that had a few broken widgets or gizmos; and depending on the circumstances, it may have been exactly the right thing to do. But nobody expects you to fly when there's something seriously wrong with the bird. Put yourself in your wing commander's shoes. Would you rather have a delay—or a major accident?

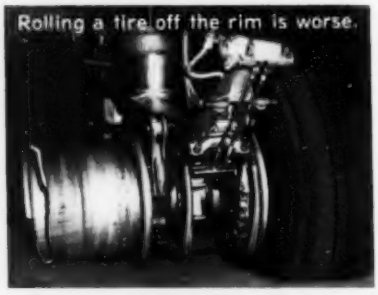
Don't let others make your decisions. This one is a special for aircraft commanders—remember, the guy we said was supposed to be the decision-maker. Sure, it's tough for a first lieutenant AC with a cockpit full of colonels or for the guy on his first "solo" line mission whose 20,000-hour engineer has a bad case of get-home-itis. But the title is aircraft *commander,* and that's exactly what it means. You're the guy who grabs the glory or bites the bullet, and you're the guy responsible for your airplane and everybody on it. So get all the advice and expertise you can—but *you* make the decision.

Don't put pressure on yourself. Ever have one of those days when half the crew showed up late for briefing, and you spent too much time swapping war stories in the flight planning room, and the copilot forgot to file the flight plan, and you forgot to call for the pax, and now you're thundering down the taxiway at 55 knots watching the seconds slip away, wiping your sweaty palms on your Nomex and thinking terrible thoughts about crew delays? If so, you know how easy it is to get into that kind of crack, and how tempting it is to cut corners and take risks to get out of it.

Of course, the cure for this situation is to keep from getting into it in the first place. A little planning, a modicum of self-discipline, and a dash of plain old attention to detail will go a long way toward preventing those last-minute blues.

Some things are worse than a crew delay . . .

But let's say that, for whatever reason, you find yourself racing the clock to liftoff. You're whipping through checklists, cornering your many-motored monster like a LeMans Ferrari and generally acting like a damned fool to try to make that takeoff time. Try to remember that there are some things worse than a crew delay. Rolling a tire off the rim on a high-speed turn is worse.


Rolling a tire off the rim is worse.

Getting violated because your high-speed crew briefing omitted an altitude restriction is worse. And pranging an airplane because your high-speed checklist operation left out a couple of items is worst of all.

How To Do It Better

Obviously, there are lots of ways to go wrong when you're really pressing to get airborne. But how about some ways to go right? How about a few techniques that aren't shortcuts, but will take off some of that time pressure and increase your safety margin? If you've ever pulled SOF duty on a really busy day, you've seen the difference between the guys who know these techniques and the ones who don't; you can tell by the presence or absence of a mad scramble as takeoff time approaches. Let's take a look at some of the "secrets."

Know your equipment. So now you're convinced that it's a bad idea to take an unsafe airplane—but how do you decide whether it's unsafe? Answer: a thorough knowledge of the airplane and its systems. If you don't have that knowledge, you can't make the decision; it'll be made for you by somebody else, thereby violating one of our "don'ts." Getting all pumped up on systems at TTU or the simulator is fine, but you've got to stay pumped up in between times by staying in the books. That way you'll be ready to mediate the dispute between the scanner who says that the aft starboard frammis nozzle is out of alignment with the trifurcated spingle housing, and the maintenance guy who says it's only three millihectares out, so it's okay to go with.

Plan ahead. You've got at least twelve hours before you launch, so make the decisions that can be made ahead of time—like whether to order the fried seagull box lunch or the frozen cauliflower stew. If you're going someplace that the computer never heard of, take into account the extra time for manual flight planning. And if you're not feeling quite up to speed physically, go see the flight surgeon *now* instead of waiting to see how you feel at alert time.

Use the whole crew. This is where the copilot can make a tremendous difference in the efficiency of the whole operation. To be effective, he has to be familiar with the prelaunch sequence of events. And he has to be out at the aircraft, not following the AC around the flight planning room. As the man on the spot, he can find discrepancies that wouldn't show up on the engineers' preflight and let somebody know about them. He can monitor the progress of loading or maintenance, keep track of fleet service, set up the cockpit for takeoff, and generally grease the skids for a smooth, easy, and unhurried departure. Sure, the SOF can and does do a lot of these things. But with a ramp full of airplanes, he can't be everywhere.

Extra crew members in the other crew positions can be a big help, too. In any case, take advantage of all the available people to expedite the early stages of the launch sequence. The more you accomplish early in the game, the better your chances of a smooth, unhurried, and *safe* departure.

See for yourself. No commander can do an effective job without some direct contact with the troops. But all too frequently, you see an aircraft commander strapped firmly into his seat, looking back over his shoulder and wistfully inquiring, "Does anybody know what's going on back there?" By the time the answer comes back, relayed through a scanner, two maintenance troops, a pax service representative, and a navigator, it generally bears little or no resemblance to the real world. Assuming that the AC has followed the previous advice about using his copilot, the TOLD data has been reviewed, the radios are checked, the charts are folded, and everything up front is ready to go. Now he can unstrap, go back to the scene of the action, and get the first-hand information he needs to make a sound, safe, and rational decision.

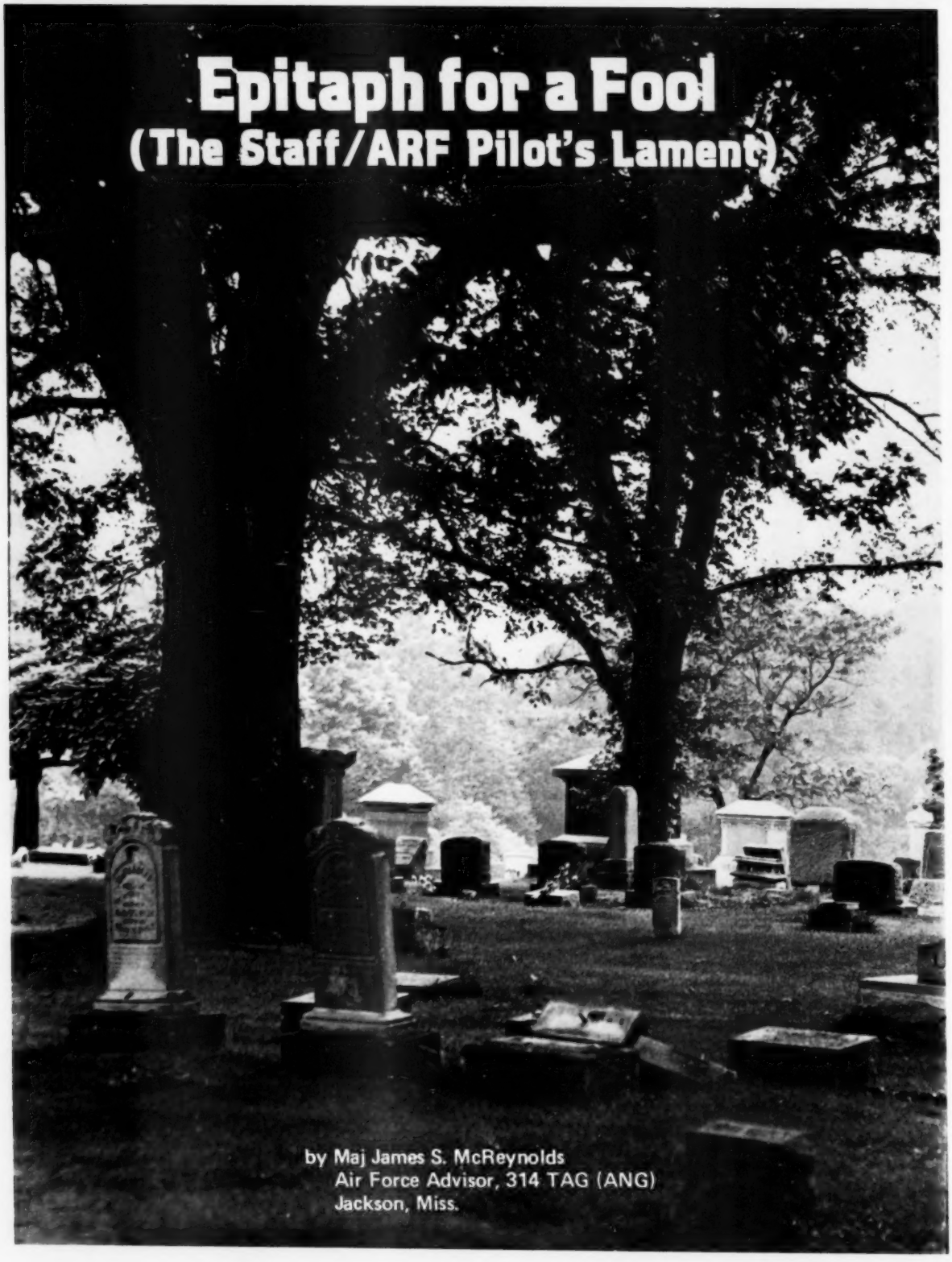
Make things happen. One of the things that can really put you into a bind for time is to recognize a problem and do nothing about it. If something needs correcting, tell the responsible party to do it. Don't assume that he knows what you need and will get around to it eventually; he may not even be aware that anything needs to be done. People sometimes need direction, so provide it. This applies to any crew member who discovers a problem—take immediate and positive action to make sure it's corrected.

One More Safe Departure

If you get the idea that all of this information is aimed at avoiding a last-minute rush to the runway, you're right. Making an on-time takeoff is fine, but no takeoff is going to be safe if it's conducted like a Marx Brothers routine. And that's really the whole point. It's great to have an unbroken string of on-time departures; the DO smiles, the squadron commander beams and the guys in the ops center chuckle as they order a fresh supply of green grease pencils.

But it's even better to have an unbroken string of *safe* departures. The chief of staff smiles because we have to replace fewer airplanes and crews, insurance agents beam as they keep collecting your premiums, and you chuckle as you look forward to collecting your retirement pay.

So make 'em all on time if you can. But most important—make 'em all safe.



Epitaph for a Fool
(The Staff/ARF Pilot's Lament)

by Maj James S. McReynolds
Air Force Advisor, 314 TAG (ANG)
Jackson, Miss.

Maj Jim McReynolds wrote the following poem to emphasize the possible results of the compounding effect when job conflicts, personal problems, and lack of professionalism coincide. Major McReynolds is quick to point out that the 172 TAG's alertness to these problems is one of the reasons that the unit celebrates 20 years of accident-free flying on 16 March 1976. The 172d is in its third year of readiness in the C-130E Hercules.

"I know you're gonna like it here,"
The veteran lieutenant said.
"Life is pretty casual and
Everything's spoon-fed."

So I jumped right in and filled some squares,
And very soon checked out.
I wasn't terribly proficient,
But could find my way about.

A few requirements
Overlooked
I was gonna catch them later.
But catching up
Is like running up
The "down" side escalator.

And then, the new job took my time,
Had to let a few things slide.
Thank goodness for a Santa Claus,
On my instrument check ride.

He understood my problems
And let me show up late.
He had to lower his standards,
You see, I wasn't great.

Pressure at the office
And more at home
You know, it isn't fair!
What the hell
Does everyone want?
I can't be everywhere!

And what if my knowledge
Is a little bit weak
And I don't fly so hot.
Procedures are rusty—
("Well, the Dash One changed!")
Man, is my confidence shot!

Now flying has gotten
To be a drag.
Something to avoid.
They pick on me;
I'm always wrong.
No, I'm not paranoid.

The pressure's mounting
Here in my head—
My brain has lost control.
My mind is still
Back at base ops
But the body's on takeoff roll.

Witnesses to the accident said
The aircraft veered to the right.
It shuddered and shook and turned inverted,
As it fell on out of sight.

And in the copilot's dying words
As they pulled him from the flames:
"He used the wrong procedure . . .
. . . mass confusion on the plane!"

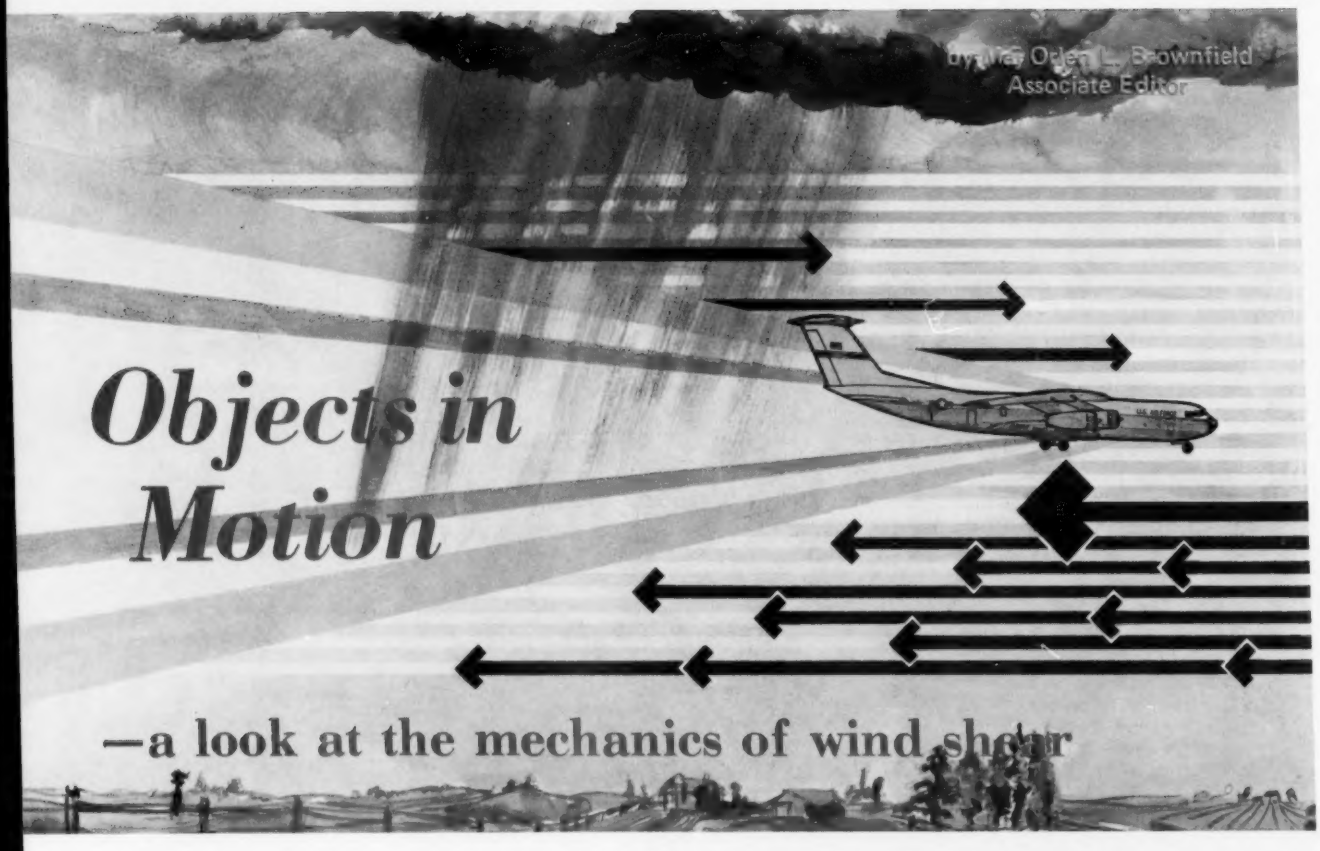
No, this accident didn't "just happen"—
It had been coming for a while.
The bosses overlooking their troops' mistakes
With a sigh, a shrug or a smile.

Oh, the board will nail the causes down
Of that you can all be sure.
They'll find the pilot's abilities
Weren't really all that pure;

That the commander wasn't commanding,
That the stand eval was meek;
That the maintenance was slipshod,
And the safety program weak.

But regardless of what the board may find
And the facts that are made known,
The ultimate responsibility
Is each man's on his own.

As a willing co-conspirator
In the breaking of the rule
He has authored for his efforts—
An epitaph for a fool.



Objects in Motion

—a look at the mechanics of wind shear

by Maj Orlen L. Brownfield
Associate Editor

Case #1

The Herky crew looked none the worse for wear as they stood at the bar, having just finished a five-hour "navigator trainer" mission. I gathered from their conversation that they had flown the usual Charleston-south to Florida overwater-then to Smeltback to Charleston profile.

This particular crew had broken the monotony in a unique way. As they passed Smelt and turned westward up Control 1152, the navigator noted that they had a 140-knot head wind — the ground speed was down to 135K. Could they actually "hover" their shiny new C-130E? They could and did.

With approval of the controlling agency, the pilot reduced power and dropped flaps and gear as the navigator monitored the doppler ground speed. The copilot and flight mech watched the DME as the numbers turned slowly and then more slowly. Finally, at about 105 KIAS, everything stopped. Approach control confirmed that the Herk was "holding" its position about 50 miles southeast of Charleston VORTAC. Some feat! Those ground types were really impressed.

"Maybe we should have *backed* down old 1152; that would have really put the impress on them!" the AC remarked and ordered another round.

"Yeah, but what if . . ." his young copilot interjected, "what if the wind had just suddenly quit blowing?" His interlocutory question brought frowns from his two colleagues.

"That'd never happen," the navigator commented.

"C'mon," the AC said. "Didn't they teach you in UPT that the only thing an airplane understands is *airspeed* and we had over a hundred knots. You know the MATS fighter will fly at 80 knots as light as we were."

"I guess you're right," the copilot apologized.

Case #2

The pilot placed his four-engine jet on final, glide slope wired, speed on the marker at 145 knots. About a mile from touchdown, his airspeed began to diminish and the rate of descent doubled. The left

seater frantically applied power and pulled the nose up in an effort to arrest the fatal descent. The aircraft struck the ground at a high angle of attack and at an IAS of 121 knots. There were no survivors.

Case #3

The pilot and copilot discussed the reports of moderate turbulence they had heard as they taxied into takeoff position.

"Naw, the other guys made it," the pilot allowed. "We'll just plan on hitting the turbulence at 200 to 300 feet like they said. Everybody is strapped in good and tight. Tell 'em we're ready."

Shortly after the big jet's wheels left the runway, something very unusual happened. At about 100 feet above the runway, the airspeed dropped from over 156 KIAS to 115 KIAS in about five seconds—with takeoff power set! With the gear up, the aircraft settled back onto the runway and began breaking up. The aircraft came to rest more than 1,000 feet beyond the departure end of the runway with the engines still running at a high power setting—control cables to the power plants had been severed.

The information from the flight data recorders of the two previously departing aircraft was analyzed. Both indicated similar data—a drop of 25 knots airspeed in ten seconds in one case and a drop of 30 knots in ten seconds in the other.

The three cases I've mentioned are fictional but based on fact or, at least, war stories at the bar. The reason they grace these pages is that they point out some of the common misconceptions about wind and wind shear.

In case #1, the navigator was mostly correct when he claimed, "That'd never happen." At least not at FL 200. And the pilot was mostly correct when he said: "The only thing the airplane understands is airspeed." But he left out a most important part: The only thing momentum understands is ground speed.

Inertia, Momentum, and Kinetic Energy

Inertia: the tendency of matter to keep moving in the same direction or for matter at rest to remain at rest.

Momentum: the quantity of motion of a moving object, equal to the product of its mass and its velocity.

Kinetic Energy: That energy of a body which results from its motion; it is equal to half the product of the mass and velocity squared.

These three definitions represent various ways of saying essentially the same thing: Bodies in motion tend to remain in motion along the same vector. To quantify this tendency, kinetic energy and momentum have very specific formulae; the product will be numerically different but both are decided using mass (aircraft weight) and velocity (ground speed, in this case).*

Static C-130

In the case of the C-130 "hovering" 50 miles southeast of Charleston, let's apply the formula mass times velocity to determine momentum. Gross weight: 110,000 pounds; ground speed: zero. 110,000 x 0 = 0, a big fat zero — none. No momentum. How about kinetic energy? 110,000 x 0^2 divided by 2 = zero, again. So the Herk had no kinetic energy, either.

So when the young copilot asked, "What would happen if the wind stopped blowing?" The correct answer would be that the indicated airspeed would drop to zero and the lucky crew would have 20,000 feet to think about it. But like the navigator said—that'd never happen.

Airspeed vs. Ground Speed

Case #2 gets a little closer to reality and a little closer to the ground — just the place you don't want wind shear.

In this case, the ill-fated jet was approaching the threshold with a 35-knot head wind component. Somewhere around 200 feet the aircraft encountered a wind shear which amounted to nearly 30 knots. Though the pilot had his computed final approach airspeed (145 knots), his ground speed, and therefore his velocity, was only 110 knots. As the head wind diminished,

*If you don't believe that the numerical value of velocity and ground speed are the same thing, picture yourself standing on the ramp in a 20-knot wind. You have 20 knots of "airspeed," but your velocity (and ground speed) are the same: zero. It's the air that's moving, not you—and the same is true of an aircraft in flight.

the airspeed began decreasing to match the velocity, robbing the aircraft of lift. The high G pullout attempt contributed to a higher stall speed and the inability to recover.

Ground Speed vs. Airspeed

Case # 3 resembles case # 2, only in reverse. We seldom hear of a wind shear problem on takeoff, probably because airspeeds for rotate and climb have a bit of a pad (normally 1.3 to 1.4 Vs) and probably because the aircraft is being operated in a max power, accelerating regime. But when the wind shear is of the proportions mentioned in this case, recovery may be impossible.

In this specific example, when the aircraft began takeoff roll, the head wind component was ten knots. Passing from 50 to 100 feet the wind abruptly shifted to a tail wind component causing a drop in airspeed of over 40 knots. The loss of airspeed and accompanying lift at such a low altitude without power reserve can only spell disaster.

History

Wind shear was one of those things that navigators used to blame a poor drop on: "I had it lined up perfect, got my timing point just right, and let her go. They called 400 yards at four o'clock — had to be wind shear!"

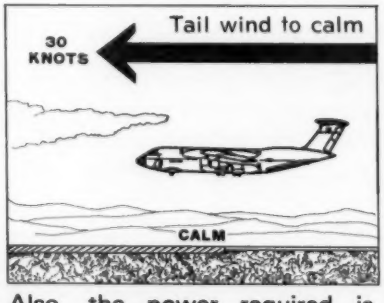
Wind shear is more and more in the news nowadays; some of those old accident files which were adjudicated "pilot error" are being looked at a second time for wind shear implications.

We've all been exposed to the phenomenon. How many times have you shot a perfect textbook approach right down to flare only to have the bottom fall out for a "buy-the-beer" prang job? Or has the opposite happened, where you seemed to float for miles in what everyone thought was "ground effect"? Most probably, these cases, though not of the magnitude of the three cases mentioned, should also be directly attributed to wind shear.

Visual Clues

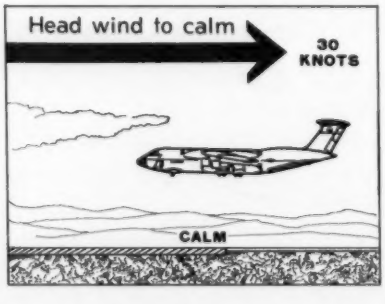
Wind shear is an elusive monster and somewhat mysterious. One of the insidious things about it is the deceptive cockpit indications you'll observe when encountering shear. To simplify we'll discuss two hypothetical cases of wind shear on landing, one with a 30-knot *tail* wind at 300 feet and calm on the runway; the second with a 30-knot *head* wind at 300 feet and calm on the runway.

Tail Wind to Calm. The erudite aeronaut who encounters this situation will realize that he's flying his approach in a high tail wind condition—his VVI indicates a 1,000 fpm rate of descent to maintain glide slope when 700 fpm is normal.



Also, the power required is less. But the first indication of wind shear will be a sudden, unexpected increase in airspeed causing the aircraft to balloon slightly because of the added lift. The pilot's initial reaction will be to reduce the already low power setting even more. If he yields to the temptation, the result will be a short landing. As the aircraft slows to final approach airspeed, the power setting will be so low that the sink rate will increase even more, perhaps to 1,200 to 1,300 fpm, when the preferred no-wind rate should be around 700 fpm. Arresting the descent by increasing pitch only compounds the problem — the higher angle of attack causes more induced drag and therefore a requirement for more power. The result will probably be a short landing because of the pilot's overreaction to cockpit indications.

Head Wind to Calm. In the opposite case, flying from a 30-knot head wind environment to a runway with winds calm, you'll again have certain subtle clues: a reduced descent rate to maintain glide slope and a slightly higher EPR/TIT setting. Again your first indication of shear will be a sudden and unexpected change in IAS. The airspeed begins to drop and due to the accompanying loss of lift your descent rate will increase.



With these clues, the pilot will most likely add power and raise the nose a little using trim. Since the 30-knot shear, we'll assume, is constant through the last 300 feet, the pilot should have plenty of time to recover and only be embarrassed by a long landing. This due to the fact that he added power beyond that required for a no-wind approach (which he should have initially) and once back on the glide path, the aircraft was in an accelerating, almost ascending regime. But had the pilot not reacted to his cues, or had the shear been sudden rather than gradual, a short landing (stall/crash/burn?) would have been inevitable.

What's a Pilot To Do?

One of the most interesting aspects of wind shear is that it's usually in the company of another of our aeronautical adversaries—the thunderstorm. In fact, there are a few cases of pilots attempting to fly their craft directly beneath (or through) a dreaded cumulonimbus on final approach — with disastrous results.

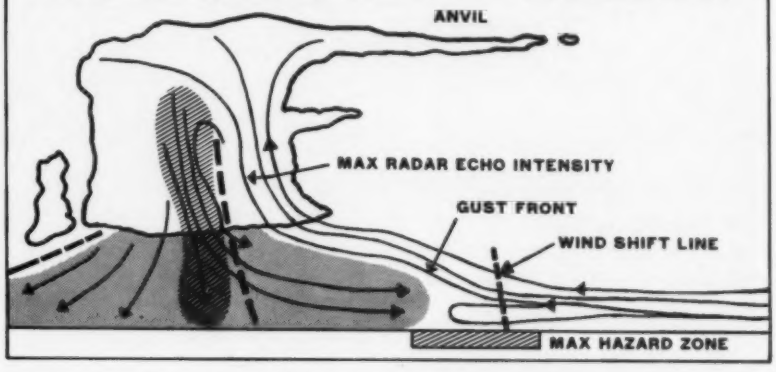
Gust fronts are usually associated with mature, severe thunderstorms and can affect aircraft performance for some distance from the actual center of the CB. (See figure 1.) So your first warning of possible wind shear could be the presence of thunderstorms in the terminal area.

VVI, EPR, TIT, Etc.

As mentioned before, your cockpit instrumentation can provide you some indications of unusually high head winds or tail winds — and if these

Figure 1

VERTICAL CROSS SECTION OF A THUNDERSTORM



don't compare favorably to those reported on the runway, you should consider the possibility of wind shear.

Unusually *high* power settings and *low* descent rates are sure fire indications of flying in a high head wind environment. If the tower is calling light and variable or a tail wind for landing, watch for wind shear.

Unusually *low* power settings and *high* rates of descent are indications of flying in a tail wind. Again, compare this information to the words you hear from tower.

Doppler

Of course the most accurate method of determining your head or tail wind component on final (or anywhere else, for that matter) involves comparing your ground speed with your *true* airspeed, and the guy with the equipment to do this usually sits somewhere behind you.

In a matter of microseconds even the neo-navigator can give you some good wind-component information. Use this information to compare with ground observations or, better yet, make the navigator figure it out and tell you what to expect as far as wind shear is concerned.

PIREP's

But the best data you can get is from someone who's been through it. Listen to reports from the guy ahead of you in the takeoff or landing sequence. But just because he made it through doesn't mean you can, so don't feel it detracts from your masculinity if you decide not to try.

The final decision is up to the man with a handful of throttles and airplane. You've been forewarned—all the clues are there: thunderstorms in the area, unusual vertical velocites and power settings to maintain glide slope, and the pilot ahead reported turbulence on final. Your keen analytical mind and lightning-fast reflexes should catch the abrupt airspeed change and depending on the "salvagability" of your approach, you adjust your actions accordingly.

Never hesitate to go around —wind shear is a killer!

Third Place Winner,
1976 MAC Flying
Safety Writing Contest

Tiger

Silence isn't always golden

This is a story about flying. And though the aircraft involved weren't "MAC types," the moral is for everyone involved in flying from the greenest copilot to DO's, wing commanders, safety types, planners, and policy makers.

I've logged a lot of air miles since my brush with death—but it's as fresh in my mind as if it had happened yesterday. Maybe it's time the story was told.

I was assigned to KC-135's after my initial tour of four years in KC-97's. I had accumulated about 1,500 hours of tanker time, but back in those days they wanted lots of experience before they checked you out as an aircraft commander. The squadron commander put me on a crew as a copilot until I had built up some experience in the KC-135.

My AC was an old World War II driver. Pete had

One

- *sometimes it's fatal.*

by Maj Patrick S. Boab
133 TAW (ANG)
Minneapolis-St Paul IAP
St Paul, Minn.

flown almost every single engine aircraft in the inventory including the Bell jet, the P-59. This made him a rare breed—a jet fighter pilot during World War II. After the war, he left the Air Corps for civilian life and flew fighters in the Air Force Reserve. He was recalled for the Korean conflict and decided to stay in the Air Force. He was flying F-86's in Air Defense Command when disaster struck.

When SAC began receiving the new KC-135, there was a shortage of jet-qualified pilots in the command. Pete came to SAC kicking and screaming all the way. After all, he was a fighter pilot and what was he doing in a many motor? Besides, there were three other people in the cockpit and Pete knew that it only took *one* person to fly an airplane.

But after being shoved up the crew-entry ladder several times and counseled on the advantages of using those

other three toads in the cockpit on appropriate occasions, Pete settled down to being a SAC pilot.

After several flights with Pete I could see that he was a fine VFR pilot. He often commented that he could put an airplane on any spot on the ground from any position in the air, and I believed him. His instrument flying wasn't quite as impressive as his VFR capabilities. But this was no problem; I could hold up that end of the job. We got along famously.

The rest of the crew consisted of the finest navigator I have ever flown with, bar none, and an old salty master sergeant who was a B-29 gunner in the good old days. We made a good crew, and we never had any serious personal conflicts. This is quite important on a SAC crew, as anyone who has spent two weeks out of a month "holed up" on alert can testify.

The war in Southeast Asia started to heat up and some "Young Tiger" deployments began to trickle down. A Young Tiger was a 60-day TDY to SEA to support fighter operations over the north. It was a super mission for us tanker types and we looked forward to going. It was going to be a welcome relief from the training flights and week-long alert tours in the States.

The missions were challenging and everyone on the crew felt a sense of accomplishment after each one. This was what all that training was about.

One fine day we were to refuel a flight of F-4's down south and recover at Kadena. We had refueled the Phantoms without a glitch and climbed up to 43,000 feet for our return leg to Koza City International.

The recovery at Kadena, called a Tiger One approach, was designed to get us down from high altitude as rapidly as possible with minimum fuel consumption. The procedure was to retard the throttles to idle, use full speed brakes, lower the landing gear, and let down at about 6,000 feet per minute. When approaching lower altitude, the rate of descent was slowed and the ILS was intercepted.

We started our descent on Tiger One. "Jeez, a beautiful night," Pete said, pulling the throttles back.

And it was. A full moon was shining and not a cloud in the sky—one of those nights that make you glad you're there, doing what you're doing—"chasing the shouting wind along," John Gillespie McGee might have said.

"Kadena, Yellow One Seven passing FL 150," I transmitted. "And we've got a visual on the runway."

"That's a roger," the controller came back. "You're number one. Give me a call intercepting glide slope."

All of the approaches were GCA monitored so we had all the help we could possibly need, expecially since this was a routine recovery on a VFR night. A piece of cake.

Pete made a slight turn to line up and called for full flaps. I obliged. The gear was already down. We accomplished the before-landing checklist as we intercepted the ILS glide slope. I settled back to watch the lights on the island. "Boy, that bed is going to feel good tonight," I said to no one in particular.

Pete went a bit below the glide slope but he had just gone visual.

I watched the lights of the ships in Naha Harbor. There must have been a million of them. The buildup in SEA sure helped the shipping business.

I noticed that Pete had added a large amount of power.

"Yellow One Seven." It was Rapcon. "Do you have the field in sight?"

"Roger, we have it," I said, noticing Pete now had full power on the airplane.

We were still sinking! I saw the runway flatten out. There wasn't any way we could make it. No one on the crew said a word. I thought, so this is how it's going to end—landing short of the runway at Kadena. What a sorry way to go!

We were less than 100 feet above the water, with an extremely nose-high attitude. Pete and I were frantically looking for the problem, but

couldn't find it. Both of us knew we would crash in the water.

"The speed brakes!" the navigator yelled. Pete's hand met mine on the handle.

The Kay-Cee almost went into orbit when the speed brakes were retracted. We landed about 4,000 feet down the runway. The airplane dribbled up and down several times before it finally decided it wanted to stay on the ground. Thank goodness it was night, so no one saw how bad the landing really was. As the old saying goes, we walked away from it, but just barely.

The ride into debriefing was very quiet. There wasn't anything to say. We had cut it about as fine as you can cut it and still be among the living.

We quietly discussed this incident with other crews. A surprising number of them had had similar experiences. The KC-135, even at low gross weight, just won't maintain level flight with the gear down, flaps down, and speed brakes out, even with full power. (I think many of the new fan-powered birds won't, either.) We were faced with the problem of what we should do about our little experience.

We knew that it would never happen to us again. Pete and I checked that speed brake handle so often after that, we almost wore the plastic off it. But the nagging question was: should we submit an OHR? (Back in the old days, we called them OHR's instead of HR's.) Rumor had it that in our squadron even anonymous OHR's had a nasty way of coming back to haunt you. Should we invite someone to take a cold, hard look at us especially when the whole thing was crew error? We agreed that the best solution was to shut up and let it slide.

•

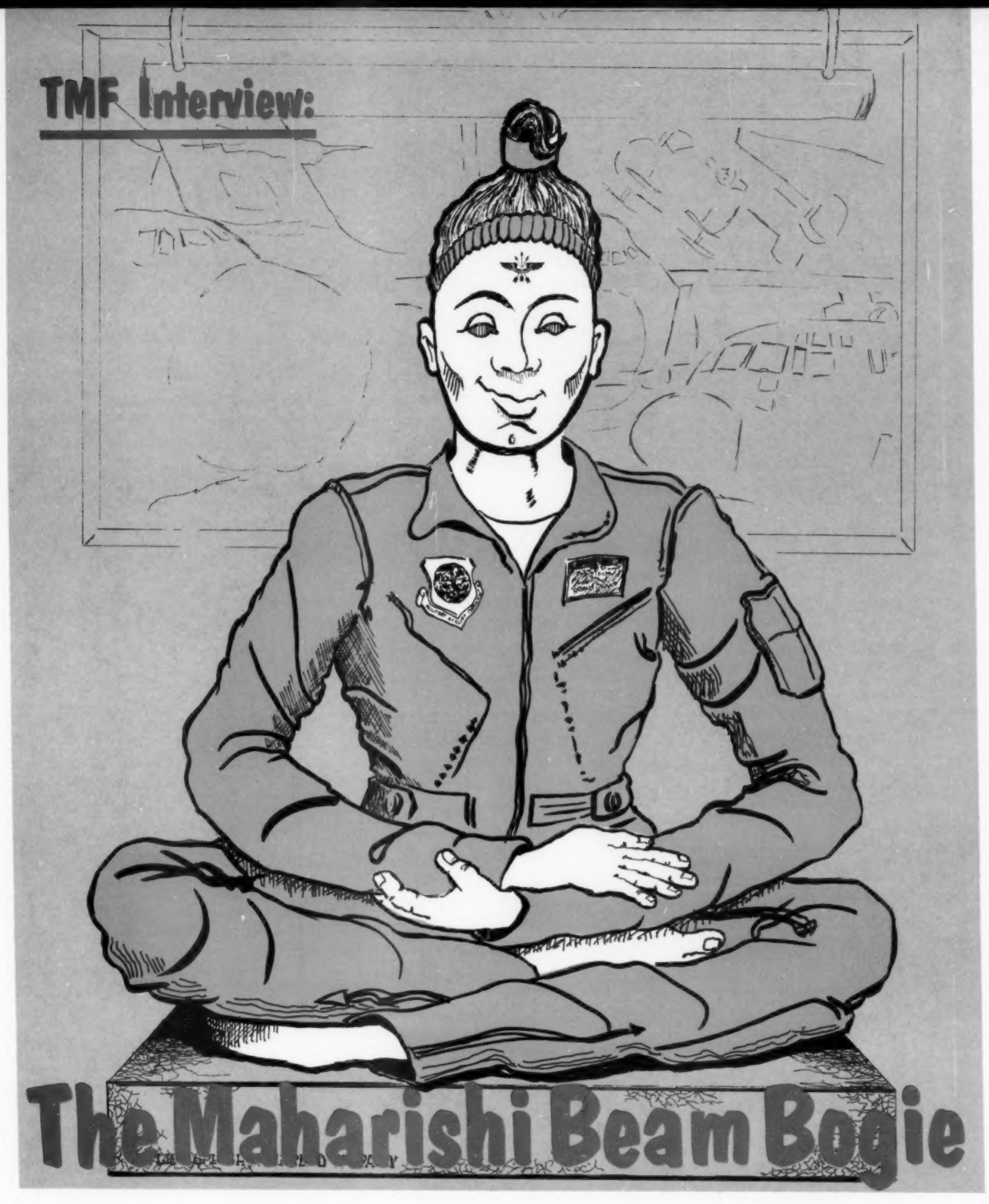
Several months later, a KC-135 crashed on an emergency landing. I'm not sure of the number, but I think 43 people were killed. The configuration of the airplane when it crashed was landing gear down, full flaps, and speed brakes deployed. Unfortunately, the pilot only had three engines running when he tried to make the runway. He crashed into a lagoon. The weather was day VFR and the accident board found that pilot error was the primary cause of the accident.

If all safety stories must have a moral, where is it here? Is there a message here for the pilot who acts like a passenger instead of doing his job? Or the other crew members who know their jobs well but feel it isn't important to learn something about other people's duties? Or the navigator working on the per diem form during the final approach back home? Maybe it is for the commander who creates an atmosphere where everyone is concerned with his career and covering his tail, and not reporting a genuine hazard. Or the designer who doesn't put a warning horn or light on the equipment when it is needed. What about the safety officer who doesn't spend enough time with the troops to catch all the rumblings and undercurrents? Or the crew that doesn't report a problem because it may cast a poor reflection on them?

Do you fit into one of these categories? I just hope you never have to fly a "Tiger One" and have it come back to haunt you.

ABOUT THE AUTHOR

Major Boab is an Air National Guardsman serving as safety officer with the 133rd Tactical Airlift Wing at Minneapolis-St Paul International Airport. He graduated from Penn State University with a degree in aeronautical engineering. Major Boab flew KC-97 and KC-135 aircraft in SAC for ten years before leaving active duty in 1968. With the Guard, he has flown C-97's and C-130's, attended Air Command and Staff College and received his MBA through Auburn University. Major Boab flies for Northwest Orient Airlines in civilian life and serves on the Airline Pilot's Association Safety Committee.



Editor's Note: Call it Fate, Biorhythms, or an Astrological Encounter, but THE MAC FLYER has succeeded in getting a bona fide scoop! The Great Maharishi Beam Bogie was passing through Scott on a whirlwind tour of college campuses when he consented to a rare interview. We found him in the Sports Bar having a drink with his old friend, C.R. Terror. It was due, at least in part, to our nodding acquaintance with the Rotund One that the Maharishi gave us audience. While the Maharishi sat on his undulating waterbed and responded in a soft, learned voice to our questions, this TMF staffer taped his comments for posterity.

An exclusive FLYER interview with the father of Transcontinental Meditation.

by Lt Col Robert E. Baltzell
McChord AFB, Wash.

Complete and unabridged, here's what we recorded:

THE MAC FLYER: Perhaps, Sir, the first order of business should be to enlighten our readers as to your background and experience. How, exactly, did you achieve the pinnacle of success you now enjoy?

MAHARISHI: You needn't call me "Sir;" I was once an enlisted man. I suppose that is a good place to start. You see, many years ago I was a flight engineer on a C-74—a bit before your time, I suppose.

THE MAC FLYER: Yes, Sir.

MAHARISHI: You did it again, my son. You may call me simply "Maharishi."

TMF: Okay, Maharishi. Tell us your story.

MAHARISHI: My story is much too long for the pages of your fine publication. Suffice it to say that I have filled every crew position on a MAC aircraft at one time or another. I felt that this was necessary in developing my eclectic approach to flying safety.

TMF: Eclectic?

MAHARISHI: Yes, young aviator—eclectic. I have gathered my scientific and philosophical knowledge from various sources. The result is my patented and copyrighted epistemological theory known as Transcontinental Meditation.

TMF: *Transcontinental?* We thought it was *Transcendental* Meditation.

MAHARISHI: Yes, they are similar but in concept only. Actually, TM—or Tango Mike, as I've heard you frustrated flyers say—originated right along with that other meditational scene.

TMF: That's very interesting. We certainly weren't aware of that.

MAHARISHI: That's quite natural, my son. A lot of people, including many flyers, don't realize that TM was designed to keep aircrews in superior mental shape for their exceptional and demanding aviational activities.

TMF: Somewhat like a system of "mental" aerobics, huh?

MAHARISHI: Very observant, my son! The brain needs a little "jogging" too. Excuse the pun.

TMF: Surely. It would help, Maharishi, if you would expand a little on your idea. Our readers may be a little confused at this point.

MAHARISHI: I'll be happy to explain. Transcontinental Meditation is a system of mental discipline for aviators which is well adapted for use on continent-spanning flights. It is really quite simple to understand and easy to practice. TM requires that once you've settled in, as comfortably as possible, you—

TMF: Settled in the aircraft, you mean?

MAHARISHI: Of course, my little one, where else? Once you've adjusted yourself into your crew position, you open your eyes and mind in meditation of the events going on around you. Of course, that really means awareness to all events and circumstances! Isn't it simply mind expanding?

TMF: Just a moment, Sir; we thought people were supposed to *close* their eyes in meditation.

MAHARISHI: A commonly held heretical fallacy, my son, which can easily be disproven. No, my young yearling, in Transcontinental Meditation the eyes must be open—and alert.

TMF: We understand; please go on.

MAHARISHI: Well, my inquisitive aviator, the rest should be quite obvious, even to a non-believer.

TMF: We believe. We believe!!

MAHARISHI: Please, calm your excitement. You're making waves in my waterbed. The secret of Transcontinental Meditation is in keeping your mind on your duties and your eyes open, seeing all. Meditation really means concentrated thought, study, and planning. TM simply means that during your aviational adventures you apply yourself fully in mind and body to the mission at hand.

TMF: You mean no more *Playboy* magazines or crossword puzzles?

MAHARISHI: Right on, brother! The concentration of the meditation can be easily broken and then almost anything can happen.

TMF: Like a midair collision?

MAHARISHI: You learn very quickly!

TMF: An unexpected encounter with a thunderstorm?

MAHARISHI: I'm constantly amazed by my superior ability to communicate!! TM also provides aerial acuity for navigators in search of high terrain and other obstructions. Flight engineers learn to foresee problems through ostensibly insignificant little warnings. And loadmasters learn to suspect misweighed loads with only the slightest club. Yes, TM opens one's eyes.

TMF: I guess it's goodbye cockpit naps. But it just sounds too simple; there must be a catch. Does TM require years of study and practice to reach your high level of proficiency?

MAHARISHI: Not at all, my innocent one, not at all. You may learn from me. You'll find that the experienced and successful professional crew member naturally adapts to the TM theory, many times without consciously realizing it.

TMF: Well, there must be some celestial force that guides those crew members in the proper direction.

MAHARISHI: There could be, of course, but we TM'ers really don't think so. It's mostly the end result of repeated exposure to many new learning situations and in getting something out of each experience.

TMF: In other words, Maharishi, true aviation professionalism takes many years.

MAHARISHI: You're right, to a point, my young but wise one. Certainly without Transcontinental Meditation, the accumulation of professional knowledge can take many years. But, with TM, the time can be considerably shortened.

TMF: Sounds like it could be difficult!

MAHARISHI: Oh, definitely not! Remember, it's concentration and awareness with eyes and mind open that does it! With that mental state firmly established, the learning process is so much faster. The uninitiated sometimes refer to this as "attitude," but I prefer "TM." It's much more tuned-in to the now generation. Even I'm amazed at how quickly adaptation is possible, with just a little effort.

TMF: Maharishi, we're grateful for this interview and the knowledge you've passed on. But we think you should know, Sir, your waterbed is leaking.

MAHARISHI: Don't panic, my celestial son; water is nature's cleanser . . . blub!! blub!!

TMF: You are certainly a remarkable man, Maharishi. This has been a most . . . glub, glub . . . memorable experience.

MAHARISHI: Save the recording! . . . blurp!!!

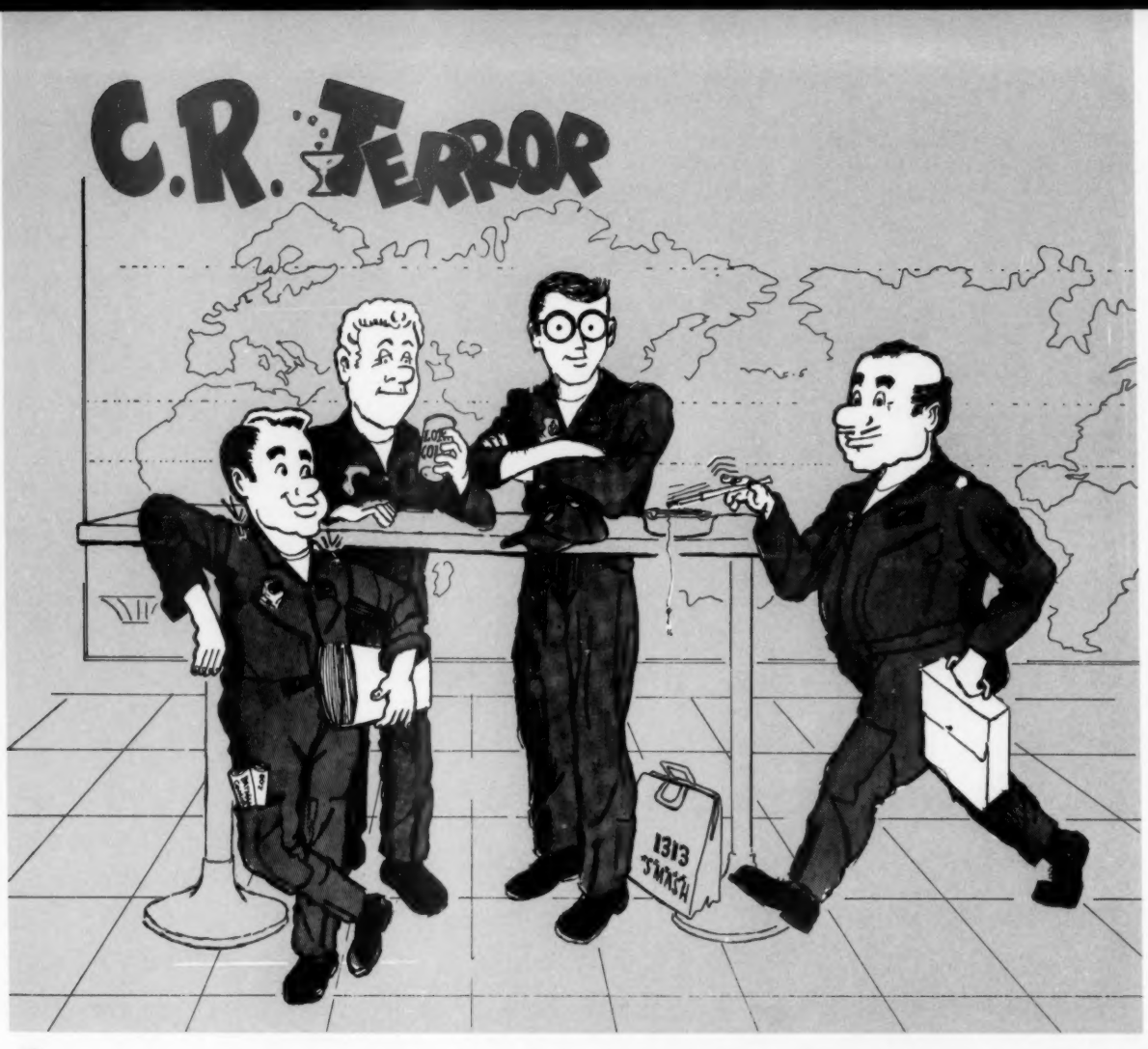
Captain Youngman

GOOD SHOW

Capt Neil A. Youngman of the 33 ARRS, Kadena AB, Japan, and his crew were on a routine mission from Osan AB, Korea, to Kadena. With their HH-53C cruising at 7,000 feet, the flight progressed normally until slightly more than two hours into the flight. Then the crew heard a loud noise coming from the upper part of the helicopter, and five seconds later the main transmission pressure caution light illuminated. Making a quick scan of his instruments, Captain Youngman observed that the transmission pressure gauge was approaching zero. At this point Captain Youngman's expert flight planning, which had included route modification to insure maximum availability of precautionary landing sites and the prebriefing of emergency procedures, paid off.

Captain Youngman spotted a small island and immediately began an emergency descent toward it while the flight mechanic made a distress radio call on the HF. The crew members in the cabin calmly and quickly prepared for a possible bailout or water landing. Approaching 3,000 feet the copilot spotted a helipad on the island and helped direct the pilot for a landing into the wind. Once the aircraft was safely on the ground, Captain Youngman ordered the immediate evacuation of all personnel except for the minimum crew required to shut down the engines.

Subsequent investigation of the disabled aircraft revealed the transmission had seized shortly after engine shutdown. Captain Youngman's thorough flight planning, excellent judgment, and flawless execution of published emergency procedures averted probable disaster and saved valuable Air Force resources. Good Show, Captain Youngman.



Lieutenant Site, duty scheduler for the 1313th Strategic Military Aerospace-lift Squadron (Heavy), grinned in anticipation as he dialed a much-used number. The grin widened as a hesitant voice answered.

"Uh - this is Lieutenant Hand."

"Hey, Ham, this is Linus. Have I got a deal for you! Major Terror's copilot just went DNIF, and since you're re-qualified again, I'm putting you on his crew. Now, try to write this down . . . "

After several readbacks, Lieutenant Site bid his quarry good day, hung up, and leaned back in his chair. His smile was smug, and just a little bit evil.

•

As C.R. entered the briefing room the next morning, Portable Potable kit firmly grasped in his chubby paw, he immediately noticed something amiss.

"Well, m'lads, I see we're ready to write a new chapter in the annals of aviation. But where is our faithful co-driver? And who is the young brown-bar here— a commissioned motor meter monitor? Speak up, m'boy."

The Rotund One's gaze had fallen upon an eager-looking second lieutenant who bore a striking resemblance to the Terror himself. With a little less hair and a little more paunch, he could have fooled even Tassels Taylor. He was trying to lean on the flight planning counter, which was a little too high for him. He carried a bulky document under one chubby arm.

"Sir, I'm Lieutenant Hand, Hamilton Hand, but you can just call me Ham," he answered nervously. "They put me on the mission when your regular copilot went DNIF. Here's my Form 21," he added, handing C.R. the heavy tome he carried.

The World's Greatest finds himself out-Terrorized by his new right seater as Long Suffering Sam gets a rest.

"Hmm," the Great One mused, slightly startled by the weight of the training folder. "Looks like the transcript of my last two accident boards. Been having a spot of difficulty with the training program?"

"Well, Sir, I suppose so," the lieutenant replied. "It's all these checklists and procedures—I don't see how anybody can keep 'em all straight."

"M'lad, you've come to the right place," the Pompous One boasted. "The World's Greatest Aviator is about to enroll you in his world-famous course, 'Flying the MAC Line for Fun and Profit.' Banish all thoughts of procedures, m'boy. They simply interfere with the conduct of the mission. We'll start by giving you the first takeoff."

Lieutenant Hand brightened somewhat. "Oh, thank you, Sir. That'll be great—I'm pretty good at takeoffs."

Blinky, Sergeant Downs, and Sergeant Torque looked at one another with obvious misgivings, but said nothing.

•

"Gear up!"

"Gear up," the Great One echoed from the left seat as the grossed-out Starlifter rotated, clawing for lift in the hot, thin desert air. C.R. idly watched the 2,000-foot-remaining marker vanish behind the aircraft and then turned his attention to the scenery passing by on his left.

Suddenly an odd sinking sensation caught his attention; the dry, rocky terrain seemed to be getting closer. Swiveling his head back toward the cockpit, C.R. riveted his eyes on his copilot, who was struggling to unwrap a stick of gum with one hand while flying with the other. Then icy beads of perspiration erupted on the Round One's forehead and all the color vanished from his nose as he spotted the VVI, which indicated a 1,000 fpm rate of descent, and the flap position indicator, which showed full up.

"Arrgh!" C.R. bellowed as he jammed the throttles forward, shoved the flap handle down to the approach detent, and hauled back on the yoke. Clouds of dust billowed from the barren earth as ground effect, extra power, and the lift from the extending flaps stopped the Starlifter's sink rate just yards from terra firma. The Master Manipulator clung to the yoke with clammy palms as the VVI once more began to indicate a climb.

Lieutenant Hand glanced across the cockpit. "Something wrong, Sir?" he inquired with mild curiosity. He had managed to get his gum unwrapped and was now trying to maneuver it into his mouth; the distraction had apparently made him miss again.

"The flaps!" C.R. sputtered. "You picked up the flaps instead of the gear!"

Hand looked perplexed. "Oh, darn, did I do that again? I keep telling them that Lockheed shouldn't have put them so close together, and besides, it's hard to remember which one is on top."

"Lieutenant," C.R. purred, his voice dangerously soft, "has it ever occurred to you that the gear handle is shaped like a wheel and the flap handle is shaped like a flap?"

The right-seater's eyes widened as he stared at the two handles. "Well, whattaya know!" he marveled. "Wonder why I never noticed that before?"

"Never mind. You've got it, Hand. Let's get the power back to NRT, and watch your airspeed."

"Uh, roger, Sir," the copilot acknowledged, hastily grabbing the yoke and losing his gum in the process. His eyes roamed anxiously over the instrument panel. "Now let's see," he muttered. "Airspeed—airspeed—I know it's here somewhere—"

"Oh, for—I've got it, Hand," C.R. said disgustedly. "Get the gear up, will you?"

"Uh, yes, Sir," Hand replied, somewhat humbly. Nothing happened for several seconds; then a very small voice broke the silence.

"Er—Major Terror?"

"Yes, boy, what is it?" the Petulant Pilot snapped.

"Did you say the gear handle was the one shaped like a wheel?"

•

Things hadn't gotten much better for the World's Most Disintegral Crew after a week in the system. C.R. had done his best, but his aspiring junior birdman and right forward scanner was still bogged down on Lesson One (When You Pull Back, It Goes Up). The Silver-Tongued Fox was hoarse from making apologies to foreign controllers whenever he let Hand talk on the radios. His nerves were raw from the unavoidable moments of panic when he had to go downstairs and leave the lieutenant in charge of the cockpit. The first time he had tried this, he'd returned to find the airplane in an ever-steepening spiral dive while Ham, totally oblivious, fished around in the bottom of his coffee cup, trying to locate his gum.

C.R. shuddered as he recalled Hand's attempt to do a left 360 on GCA dogleg into Iwakuni (to "give himself a little time"); that one had required an over-G inspection on landing. Or the SP lieutenant who informed the Aviator with Avoirdupois that his copilot was in custody, having ridden his brand-new Honda across the Yokota ramp to the aircraft, wearing civilian clothes and minus his line badge.

Worst of all was the moment at Hickam Customs. Hand was on his way out the door when he turned to yell back to C.R., who was still undergoing the scrutiny of the customs agent: "Sir, do you want me to take your extra booze with me or put it in that bag you left on the bus?"

MAC's Foremost Aviator had also discovered that his new copilot had a serious drinking problem: he never bought. C. R. had taught him to roll dice at their first en route crew rest; this had proved to be a major mistake, and the Round One's supply of checks was nearly depleted as a result. Ever since the first practice roll, field-grade money had been the order of the day. Even Blinky had been getting a free ride.

But now, C.R. thought with immense relief, the trip was nearly over. One more approach and landing and he'd be rid of his fledgling albatross, except for the final task of adding another chapter to the bulging Form 21.

The Round One retransmitted the last AIREP, apologized to McClellan Airways, and called for the descent checklist. He had learned three things about checklists on this trip: first, that *somebody* on the airplane had to use them (a gear-up, very low approach at Yokota had convinced him of this); second, that a very close monitor of all checklist actions was definitely in order (Lieutenant Hand seemed to have particular difficulty with technical terms such as OFF and ON); and third, that the required check should be called for well in advance (the Adolescent Aeronaut had a regrettable tendency to lose his place on the scroll checklist).

The World's Loosest Lieutenant had finally found the right frequency for Los Angeles Center. "Uh, San Bernardino Approach, this is MAC—uh, wait a minute, I know the number is here someplace—uh, well, anyway, all I need is the, uh, whatchamacallit—you know, the four numbers I put in my little window."

After a pause, a somewhat puzzled controller replied, "Ahh—unidentified MAC aircraft calling Los Angeles Center, current altimeter setting is three zero zero three."

"Gotcha, Chief, thanks a bunch. Sir, the altimeter is three three—er, three zero three—or was it, ah—"

"Never mind, Ham, I've got it. Try to remember to check it on the way down this time." This had been a sore point with the Ace of Aerospace ever since his Stumbling Sidekick had broken off the altimeter set knob in an effort to dial in 22.99 on climbout from Kadena.

But the right seater was determined not to be caught short this time. As the aircraft descended through 18,000 feet, he firmly announced, "Transition level—two nine nine two, copilot." He beamed with pride at C.R., who was unable to do more than gnash his

teeth in frustration.

Eventually, the aircraft was established in a holding pattern as the Gruesome Twosome awaited approach clearance. But now a problem which had been bothering the Master Manipulator for some time became extremely critical. Unwilling to leave his seat during the entire leg from Hickam for fear of the possible consequences, he had judged his endurance a little too closely, and the delay in holding proved to be too much. He could hold off not a moment longer.

"Copilot's airplane," he announced, quickly unstrapping. "I've gotta go downstairs. For Pete's sake, leave it on autopilot. Try to get vectors around the holding pattern. I'll be right back." He bolted from the flight deck.

He returned only moments too late. As he scrambled back into the cockpit, the runway threshold was passing some three hundred feet below the airplane.

"Hand, What the hell are you doing?" the Round One frothed.

"Making the landing, Skipper. We got cleared, and I didn't want to hold up traffic."

C.R. was still trying to get strapped in. "Take it around! Take it around! You're too high!" His anguished cry was cut short as the main gear thumped down just past the 2,000-foot-remaining marker.

"No sweat, Boss. I'll get 'er stopped." The lead-footed lieutenant stomped on the brakes and C.R. suddenly found himself pinned to the yoke. The big bird came to a smoking, shuddering halt with some 300 feet of overrun left.

"Now you've done it!" groaned the Field-Grade Fumbler. "Shut her down and we'll call for a tug." Visions of FEB's danced through his head.

"No, we won't," Hand retorted. "My IP at Outback was a 130 jock in 'Nam. Just watch this." He slammed the throttles into reverse.

"Aaargh! No! Wait! Stop!" C.R. screamed. But it was too late; the Starlifter was already gathering rearward momentum. The Pudgy Pillar of Pilotdom once more found himself sliding underneath the dash. "I said STOP!!!" he screeched again.

Hand shrugged. "Okay, Sir, if you say so." Once again he stood on the brakes. Slowly and gracefully the nose of the aircraft began to tip toward the sky as an aft CG and inertia took their toll. Gaping in awe, C.R. watched the horizon disappear and felt the gentle thump as the big bird settled on its tail and stopped. It remained there, like an obedient beagle waiting for a handout, as the Paunchus Pilot pulled the fire handles. Tears streamed down his face as he headed for the aft exits and the waiting staff cars.

•

"Any questions, Major?" the colonel asked frostily.

The inquisition had seemed to go on forever; apparently, it was now over. C.R., his newly initiated Form 21 grasped firmly in his sweaty hand, was more than ready to leave. But he did have one thing on his mind.

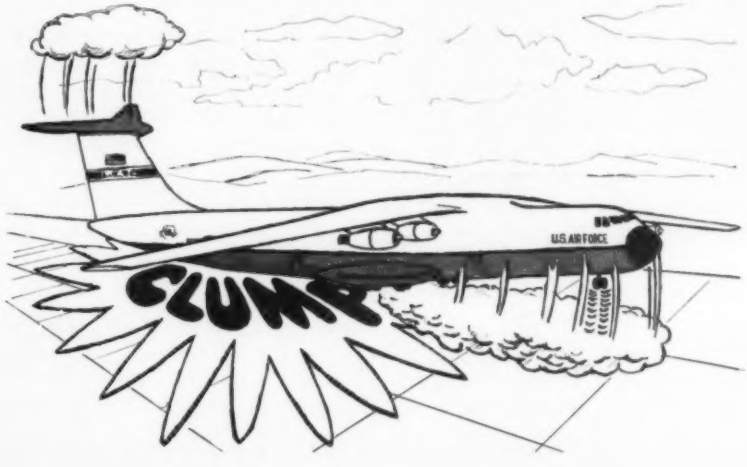
"Yes, Sir. Well, not a question, but sort of a request."

"Better make it a good one, Terror; it's likely to be your last."

"Uh, well, Sir— I was wondering, when I get requalified, well, uh—"

"Go on, Major."

"Well, Sir—do you think I could have my old copilot back?"



Quick Stoppers

The Door Sure Looked Closed

The Galaxy had been serviced for its third day of local flying. Preflight was normal, and the morning local produced no unusual problems. During the preflight for the afternoon local, maintenance personnel discovered that the liquid oxygen door panel assembly had been ripped from its hinges and was missing. The panel was never found. The flight crew indicated that the entire flight had been in the local area, at an altitude of no more than 6,000 feet, and in occasional light turbulence. The door had been closed for takeoff.

Investigators found a dent located just above the door aperture. The location of the dent and a small puncture of the aircraft skin indicated that the door had departed the big bird with some force. When four other local C-5's were checked for like problems, it was learned that the latches could be closed in such a manner as to visually indicate a locked condition but further pressure was required on the push button to achieve a fully locked condition. Moreover, when the door was not in the fully locked position, a sharp rap would cause it to spring open; in flight, light turbulence could have the same result, and the air flow would be sufficient to rip the door off.

Mud Dauber Clobber

The civilian Cessna was on a cross country flight in good weather at 4,000 feet MSL. Suddenly, things got awfully quiet. As the high-time pilot stated, "The engine quit without warning." He immediately took up a heading for a nearby grass strip. Using carburetor heat, he got a little response. By pumping the primer, he got an occasional "burst of power."

But not enough—the pilot stated he had to stretch his glide to the limit to reach the 1,800-foot turf runway. Dodging a bridge, some buildings, and trees near the approach end of the runway, the sick Cessna stalled at about ten feet AGL. The liftless light aircraft landed hard and wiped out the nose wheel. After a 200-foot run on the main gear, the nose fork dug into the ground and the Cessna went slowly over on its back. Both occupants escaped without injury but the wee bird received more than cosmetic damage.

Investigators found that there was plenty of fuel in the tanks and carburetor and that the fuel lines were free of contamination. The engine proved to be okay also. So what had happened?

The fuel vent line—which had not been in contact with the ground—was plugged solid with dried mud. The fuel starvation problem was caused by a busy "mud dauber."

Zero Knots and Climbing

During the initial takeoff roll at the 90-knot airspeed check, the pilot and the copilot noted a five-knot airspeed differential. The aircraft commander elected to continue the takeoff. As the KC-135 rotated, the airspeed differential increased to ten knots, with the copilot's indicator low. During climbout, his airspeed indication continued to decrease, and the altimeter, mach indicator, and VVI began to lag. The angle of attack appeared normal. After level-off at 10,000 feet and 250 knots on the pilot's instruments, the copilot's altimeter indicated 8,350 feet and the airspeed indicator showed 180 knots. The navigator's TAS meter read abnormally low, and his altimeter showed 8,350 feet. En route to FL 200, the copilot's airspeed indicator went to zero. After a radio conference with the command post, a controllability check, and fuel dumping to reduce weight, a descent was executed and the aircraft was depressurized. Some of the copilot's and navigator's instruments began to display normally during descent. The aircraft landed with no further problems.

This was the first flight since phase inspection, and the problem had been caused over two weeks earlier when a leak check was performed on the copilot's pitot-static system. A loose bulkhead backing nut on the copilot's static test port had not been detected. It was found on postflight by AMS and quality control personnel.

Loose Load

It was a floor load—a 10,000 pound forklift—and it was attached to the Starlifter with a 25,000-pound capacity restraint rail tiedown fitting. But about three seconds after takeoff power was applied, the tiedown fitting at the left forward corner of the forklift came out of its receptacle. The heavy Hyster shifted aft and swung to the right side, jamming against the catwalk. Two 10,000-pound capacity restraint rail tiedown rings failed, and two 10,000-pound chain tiedown devices were damaged by the forklift's shifting. The remaining tiedowns held the load; an alert loadmaster advised the skipper, who aborted the takeoff.

Anybody Seen My Ball Cap?

The aircraft had flown during the day, and no FOD had been observed on any of the engines during the through-flight inspection. However, local teardown of the number one engine revealed several nicks, tears, and dents on the first stage of the N-1 compressor. Investigators could not find the cause.

During overhaul of the engine, pieces of blue cloth were found in the small gap where the two halves of the first stage stator vanes of the N-1 compressor are joined together. The nicks were probably caused by the grommets of a blue baseball cap; the damage to the compressor blades was typical of cloth ingestion. An investigation of maintenance personnel was conducted to see if someone had recently lost a blue baseball cap. The results were negative.

If you happen to see a dude wandering around the flight line looking for his hat . . .

Qs

A Bolt from the Blue

It was the last leg, and the C-9 was homeward bound. The crew had gotten a weather update at the last stop; arrival weather was no problem. En route weather remained unchanged from that encountered inbound approximately 30 minutes earlier. Local observations showed 3,500 broken, 7,000 broken, visibility seven miles, with thunderstorms north moving southeast. The Nightingale was 13 miles north of the base at FL 70 when it was struck by lightning. The pilots were using airborne weather radar at the time, but saw no cells.

The aircraft suffered only minor damage: some loose rivets, slight damage to a static discharger, and deployment of the crash position indicator. The CPI was later recovered with no damage. The pilot continued on to his home base without difficulty.

Just because you have been there before, metro says the weather isn't too bad, and there is nothing on the radar, it doesn't mean you are home free. Lightning strikes can and do occur even when you are seemingly in the clear.

Careless-airless

A MAC crew was participating in a training mission at FL 210 with the aircraft depressurized. While performing crew duties, one of the crew members became disconnected from his oxygen supply by the separation of oxygen hose sections at a joint in the hose. The break was eventually noticed by another crew member, but not until after the first crew member had started to show signs of hypoxia. He was given oxygen from another source, and his hypoxia symptoms subsided. The repressurized aircraft returned to base, and the crew member was taken directly to the flight surgeon after landing. The alertness of other crew members prevented the aviator from loss of consciousness due to hypoxia. Everyone who flies should know his own hypoxia symptoms and be watchful for those telltale signs in others.

Remember the Little Guy

Rapcon was providing radar vectors to final approach for the descending C-130. The Herk was at 3,000 feet when approach called out traffic at 12 o'clock and one mile. Seconds later the MAC troops spotted an orange and white Cessna 150 about 400 feet away in a descending turn. Even with evasive action the aircraft closed to an estimated distance of 250 feet. Rapcon was advised immediately and then contacted on the ground by phone. Discussion with the local FAA people confirmed that the civilian pilot was operating IAW applicable FAR's.

Just because you are in radar contact and being vectored for landing doesn't mean your flight path is "sterilized." In this case the little one was flying VFR, just below the base of a cloud deck. Crews should be especially watchful when transitioning from instrument to visual procedures.

after deadline . . .

SOF SERVICE, AIR FORCE-WIDE -- Looks like you'll be finding the friendly Supervisor of Flying at all Air Force bases from here on. The new AFR 60-2 establishes the requirement for a SOF in order to insure positive supervision and control of USAF flying activities. Expect little change in MAC's SOF program, except that the MAC SOF will now provide service to all aircraft.

IT HAPPENED AGAIN -- A MAC aircraft was given a descent to 8,000 feet and a vector of 155 degrees by a foreign controller. The crew knew that some rather hostile terrain surrounded their destination, so the navigator quickly checked the course and found in their path a 10,750-foot mountain which was obscured by clouds. The controller later stated that he had misunderstood their request, thinking they were VFR.

BICENTENNIAL ISSUES -- For those of you who called asking for extra July issues, we've got 'em now. Call or write stating your requirements.

NEXT MONTH --

* "What Do You Say to a Guy with 8,000 Hours?" Obviously something, but what? Don't miss this Honorable Mention story from our flying safety writing contest.

* Putting the impress on the dollies with your magnificent feats of airmanship might get you in trouble. Read all about it in "Sunday Afternoon Hero."

* We've assembled words of wit and wisdom about how some other people feel about flying. Don't miss Erica Jong, Bob Green, et al, in "High Fright."

U. S. GOVERNMENT PRINTING OFFICE: 1976-665-669/13

Touch 'n Go

"TOWER, 771 CLEAR OF THE ACTIVE"